United States
Environmental Protection
Agency

Office of Research and Development
National Health and Environmental
Effects Research Laboratory

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WESTERN ECOLOGY DIVISION

Meeting Information Needs for the EPA and the Nation

The Western Ecology Division (WED) is part of the National Health and Environmental Effects Research Laboratory (NHEERL). WED scientists provide information to EPA offices and regions nationwide to improve our understanding of how human activities affect estuarine, freshwater, and terrestrial ecosystems. The Division has disciplinary expertise to address a broad range of ecological issues in an interdisciplinary manner. Our scientists regularly collaborate with scientists in other EPA research labs across the country. Co-location of EPA scientists with other research programs in Corvallis and Newport, such as those at Oregon State University, USDA Forest Service, USGS Biological Resources Division, NOAA Fisheries, and others, has greatly enhanced our collective capabilities.

Our Information Has Contributed to Environmental Improvements

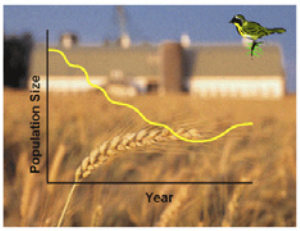
Past research programs at WED have influenced environmental policy in the United States and elsewhere in the world. Early work on nutrient enrichment of natural waters, also known as ***eutrophication***, led the Office of Water to improve surface water quality standards. WED scientists led efforts in ***acid rain research*** that influenced policies and regulations restricting air pollutants in the U.S. Studying the ***effects of ozone on terrestrial ecosystems*** led the Office of Air to undertake changes in regulations. WED scientists have developed ***ecological survey techniques for assessing the condition of aquatic ecosystems*** that are used nationally. Wetland assessments have ***helped define new federal policy*** on compensatory wetland mitigation. Research at WED has contributed to ***better tools for pesticide risk assessments*** for protection of wildlife and their habitats.

WED Scientists Continue to be Leaders in Environmental Research

Research at WED continues a long tradition of developing relevant information to meet Agency and national needs. Current work focuses on meeting information needs for the Offices of Water and Pesticides as well as information requested by Regional EPA Offices to benefit the citizens of their respective States throughout the U.S. :

- **Assessing the condition of the Nation's waters.** WED scientists have developed innovative approaches to accurately assess and monitor the condition of U.S. waters. Federal and State agencies charged with maintaining clean water under the Clean Water Act rely heavily on the information generated using these techniques developed by the Environmental Monitoring and Assessment Program (EMAP) at WED. Efforts are under way to implement and improve these techniques for both coastal and freshwater environments in the U.S..

- **Evaluating habitat requirements of coastal salmon.** We are identifying the most important characteristics of streams and landscapes that must be protected or restored to improve spawning and rearing habitat for at-risk populations of coho salmon and other aquatic species.



- **Assessing the risks of pesticide use to crops, native plants, and wildlife.** New, innovative GIS and modeling techniques are being developed by WED scientists to support EPA's Office of Pesticide programs' valuations of environmental risks from pesticide use nationwide. These techniques will allow EPA regulators to more fully assess individual and cumulative risks that chemicals pose to a broad spectrum of plant and animal species. These techniques also show great promise for assessing the potential impacts of other stressors on the population viability of key wildlife species and key ecosystem processes.

- **Determining the impacts of nutrients on freshwater and estuarine ecosystems.** Nutrients coming into streams, rivers and estuaries can have both positive and negative effects on aquatic life and use of those waters by humans. By more fully understanding complex relationships of nutrient and food web dynamics, WED scientists are providing Regional Offices and the Office of Water with information that can help guide management of excess nutrients coming into our nation's waters.
- **Assessing risks of genetically engineered crops to native plants.** Recent concern over use of genetically modified crops has resulted in increased efforts to understand the potential risks of movement of genetically altered materials into native plant communities. As the use of genetic engineering increases in agricultural enterprises, this work will be key to guiding the development and application of these new organisms.

WED's Capabilities

The long-term success of WED is due to its dedicated and highly capable workforce that consists of over 80 federal employees and over 100 contract employees. In addition, WED is very active in employment of student interns and post-doctoral researchers to ensure that the next generation of environmental scientists can learn from our senior scientists. Our scientific expertise is distributed among four research Branches, with a diversity of expertise addressing a number of contemporary issues facing the Agency:

Aquatic Monitoring & Bioassessment Branch

- Developing statistical approaches to assessing the status and trends of environmental conditions at various scales.
- Developing statistical sampling methods and new approaches to spatial analyses.
- Developing new approaches to assessing the biological conditions of freshwater resources
- Characterizing and assessing ecoregions across the country.

Pacific Coastal Ecology Branch (Newport)

- Assessing the effects of ecosystem stressors such as nutrients, sediments, pollutants, and exotic species on estuarine species, habitats and food webs.
- Documenting the condition of estuarine habitats and their use by indigenous fish and shellfish.
- Assessing the biological condition of estuarine and nearshore marine environments.

Risk Characterization Branch

- Developing tools to understand and predict effects of stressors on terrestrial ecosystem functions.
- Characterizing the relationship between terrestrial ecological processes and aquatic ecosystem conditions.
- Analyzing the effect of landscape patterns and pesticide applications on habitat quality for wildlife.
- Understanding risks to native plants associated with genetically engineered crops.

Watershed Ecology Branch

- Identifying key characteristics important to recovery of coastal streams as habitat for salmon and other fish.
- Understanding and predicting the effects of stressors on linkages between terrestrial and aquatic systems of watersheds.
- Documenting watershed processes to inform terrestrial, freshwater and whole watershed models.

WED – Capable of Addressing New and Emerging Information Needs

Our disciplinary expertise allows us to be prepared to respond to new and emerging Agency needs effectively and efficiently. Issues that arise in any of the following areas can be addressed by our scientists, staff and unique experimental facilities:

- Air pollution
- Acid rain
- Aquatic ecology
- Alternative futures analysis
- Benthic ecology
- Biodiversity conservation
- Biostatistics
- Biogeochemistry
- Climate change
- Ecosystem modeling
- Ecological sustainability
- Environmental chemistry
- Environmental engineering
- Environmental monitoring
- Estuarine ecology
- Fisheries biology
- Forest ecology
- Geographic information systems
- Hydrology
- Infectious diseases
- Landscape ecology
- Limnology
- Microbial ecology
- Molecular ecology
- Marine ecology
- Nutrient dynamics
- Oceanography
- Plant-soil relationships
- Plant toxicology
- Riparian ecology
- Risk assessment
- Seagrass biology & ecology
- Sediment chemistry & toxicology
- Soil processes
- Spatial statistics and analysis
- Stable isotope analysis
- Stream ecology
- Systems ecology & modeling
- Water quality
- Wetland ecology
- Wildlife biology & toxicology

WED – Building scientific foundations for sound environmental decisions

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Or visit our Website for more information about us: www.epa.gov/wed